Ongoing research activities under each concept element include concept development, research prototype development, concept validation, cost/benefits assessments, and safety assessments.

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Information Management for Airline Operations

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Ames researchers are investigating airline delays in a collaborative project with United Airlines (UAL). The research team is conducting a systemic study of airline operations and delay situations in United's operations at San Francisco airport in order to identify potential sources of up-to-the-minute, real-time delay information and ways to feed that information, electronically, into the Ames-developed Surface Management System (SMS) technology. Such information will improve traffic movement on the ramp (non-taxiway) area of the airport and increase the overall efficiency of the air traffic system. By collaborating in the project and opening their operations to Ames' researchers, United is benefiting from an increased understanding of their own delay situations, their work-practice procedures, and the ways that information technology and communications systems can be used to better manage their operations and to reduce delays and their effects.

The initial study has focused on United's Shuttle operations. Through a process of intensive fieldwork that includes observations, interviews, and the writing and analysis of field notes, the researchers have identified areas of work procedures that have been analyzed for communication, computer support, and knowledge-management requirements, and for the ways in which these areas organizationally either contribute to or help manage delay situations. Four areas were studied in 1999: (1) the ramp area of the airport where planes are parked at the gate and where baggage and cargo are loaded and unloaded (see figure 1); (2) the bag room; (3) the station operations center or local control center for operations; and (4) customer service operations.

Additionally, in 1999 the team visited United's operations, data analysis, and scheduling centers at UAL's world headquarters in Chicago to study the larger system environment of UAL and the effect that this environment has on local San Francisco operations.

Preliminary study findings have identified the complex nature of airline delays, problems in teaming structures and the lack of training in procedures, and "disconnects" in information flows across UAL. The study has helped to define a new information environment—one that facilitates information flows and provides the information required for the next generation of decision-making tools at UAL, and one that can also provide delay information to an SMS technology.

Fig. 1. Ramp operations.

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